UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,386	01/09/2004	Keitaro Shigenaka	247456US2SRD	7900

22850 7590 03/24/2006

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
SUNG, CHRISTINE	
ART UNIT	PAPER NUMBER
2884	

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/753,386	SHIGENAKA ET AL.	
	Examiner	Art Unit	
	Christine Sung	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11-20* is/are allowed.

6)☒ Claim(s) *1-4 and 6-10* is/are rejected.

7)☒ Claim(s) *5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0104, 1205, 0305*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Ross (US Pre Grant Publication 2004/0099920 A1).

Regarding claims 1 and 6, Rossi discloses an infrared image sensor comprising:

a substrate (figure 3A) having an image area on which infrared radiation is made incident (element 32), and a non-image area out of the image area (element 31);

a plurality of first heat-sensitive parts arranged in columns and rows on the image area of the substrate (figure 3B, element 32), each of the plurality of the first heat-sensitive parts (see array of element 32) having a thermoelectric conversion function of converting a temperature into an electric signal in the state where a bias current is applied thereto (paragraph [0044]), and a structure of absorbing the infrared radiation;

a plurality of second heat-sensitive parts provided in the non-image area of the substrate (figure 3B, element 31), the plurality of second heat-sensitive parts provided to correspond to the respective rows (figure 3B, 31 corresponds to rows and columns of element 32) and having the same thermoelectric conversion function as that of the first heat-sensitive parts;

a bias current supply circuit which supplies the bias current to the first heat-sensitive parts and the second heat-sensitive parts (paragraph [0045]);

an output circuit which outputs the electric signal of the first heat-sensitive parts (Figure 3c);

and a bias current control circuit which controls the bias current to be fed to the first heat-sensitive parts, according to an electric signal of the second heat-sensitive parts (paragraph [0045]).

Regarding claim 2, Rossi discloses an infrared image sensor where the first heat-sensitive parts being arranged in m rows and n columns in the image area (see figure 3A, elements 32), and the second heat-sensitive parts being arranged in m rows and 1 column in the non-image area (see figure 3B, element 31).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi (US Pre Grant Publication 2004/0099920 A1).

Regarding claim 3, Rossi discloses the limitations set forth according to claim 1, but does not explicitly state that the non-image area (element 31) is in a position out of an irradiation area of an optical lens for condensing the infrared radiation on the image area. However, it by definition, a "non-image" area would be an area where a desired image is not being detected. Therefore it is obvious to one having ordinary skill in the art at the time the invention was made that the non-image area would be out of the focusing range of the lens that is used to focus the desired image.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi (US Pre Grant Publication 2004/0099920 A1) in view of Nakamura (JP 05-172635)

Regarding claim 4, Rossi does not disclose the specifics of the optical elements namely a shielding structure which blocks the infrared radiation made incident through the optical lens such that the infrared radiation is not made incident on the non-imaging area. However, it is obvious that any radiation that is useful for image detection would not want to be detected in the non-imaging area because the useful radiation is necessary in determining and accurate image. Nakamura discloses an IR sensor with a shielding structure (Figure 1, element 11) that limits the radiation to the detector (element 3). One of ordinary skill in the art would be motivated to use the detector as shielding structure to direct the radiation to the part of the detector that detects

useful radiation so as to increase the efficiency and reduce extraneous radiation from reaching the detector.

7. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi (US Pre Grant Publication 2004/0099920 A1) in view of Parrish (US Patent 6,028,309 A).

Regarding claims 7 and 8, Rossi discloses the limitations set forth in claim 6, but does not explicitly specify that the thermoelectric converter senses a rise in temperature as a decrease in resistance. However, conventional IR imager elements, or bolometers detect changes in temperature (measure IR radiation) and such detection is determined via changes in resistance, as disclosed by Parrish (column 1, lines 13-25). One of ordinary skill in the art would be motivated to use the thermoelectric converter or conventional bolometer as disclosed by Parrish with the invention as disclosed by Rossi in order to accurately quantify the detected IR radiation.

Regarding claim 9, Rossi does not explicitly disclose that the thermoelectric conversion function comprises a plurality of thermoelectric converters connected in series, but does disclose an array of IR imaging elements (see figure 3b). Parrish discloses an array of IR imaging elements or an array of bolometers (Figure 9) that are connected in series (column 9, lines 47-59). Bolometers are usually connected in series in order to accurately control the bias voltages/currents applied to the bolometer array to maintain absolute and relative measurements accurately. Therefore one of ordinary skill in the art would be motivated to use the bolometer configuration as disclosed by Parrish with the invention as disclosed by Rossi in order to increase the uniformity of detector array.

Regarding claim 10, Rossi does not specify the conventional bolometer structure as disclosed in claim 10. However, such a structure is disclosed by Parrish (see figure 7), where each of the first heat-sensitive parts and the second heat-sensitive parts being hung (element 3), apart from the substrate (element 8), by a low-heat conductor or arms (element 9) in a hollow-body part provided in the substrate.

Allowable Subject Matter

8. Claims 11-20 are allowed.

9. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 5, none of the prior art of record species or makes obvious an infrared image sensor as claimed, namely the relationship of the bias current control circuit element that comprises a source follower circuit which inverses the electric signal from the second heat-sensitive parts and outputs an inversed signal and the control circuit element which controls the bias current flowing through the first heat-sensitive parts, with the inversed signal used as a control voltage. Although references such as Rossi disclose a general application of a bias control circuit, it does not specify the exact relationship of the bias current control circuit and the control circuit element which utilizes the inversed signal to control the applied voltage.

Regarding claims 11-20, none of the prior art of record specifies or makes obvious an IR imager as claimed, namely the control circuit element that controls the bias current supplied to the first heat sensitive parts of the image area on the basis of the voltage generated on the second

signal line but suppresses changes in detection signal that result from a rise in temperature of the first heat sensitive parts. References such as Rossi (cited above), disclose adjusting the bias current of the detecting heat sensitive areas based on what was detected by the second heat sensitive parts (see above). However, none of the references disclose a control circuit for suppressing the any changes that raise the temperature of the first heat sensitive parts.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 7-3 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christine Sung
Examiner
Art Unit 2884

OTILIA GABOR
PRIMARY EXAMINER

CS